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## ABSTRACT

This issue brief discusses the barriers to technological access for students with disabilities. Challenges for bridging the digital divide are discussed and the following recommendations are provided: (1) stakeholders should have access to training so they can design and select accessible facilities, utilize computers and software, purchase appropriate assistive technology, and ensure that students with disabilities use technology for their maximum benefit; (2) policies and procedures should be established at all academic levels to ensure that universal accessibility is considered when electronic and information technology is procured; (3) policies, procedures, training, and support should be established at all educational levels to ensure that Web page, library resource, and distance learning program developers make their electronic resources accessible to everyone; (4) interagency collaboration planning, funding, selecting, and supporting assistive technology should be fostered; (5) students with disabilities should be included at all stages of technology selection, support, and use, so that they learn to self-advocate; (6) students with disabilities at high school and college levels should participate in internships where they can practice using technology in work settings; and (7) policy makers should disseminate information about current laws, policies, and resources that are universally designed to meet the needs of various stakeholders. (CR)

**Bridging the Digital Divide in Postsecondary Education:  
Technology Access for Youth with Disabilities  
NCSET Information Brief**

**By**  
**Sheryl Burgstahler**

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# Information Brief

**Addressing Trends and Developments in Secondary Education  
and Transition**



**National Center on  
Secondary Education  
and Transition**

Creating Opportunities for Youth  
With Disabilities to Achieve  
Successful Futures

A partnership of —

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## Bridging the Digital Divide in Postsecondary Education: Technology Access for Youth with Disabilities

By Sheryl Burgstahler

### Introduction

Today, technology plays a role in almost all educational, employment, and recreational activities. Computer access has the potential to help people with disabilities complete coursework independently, participate in class discussions, communicate with peers and mentors, access distance learning courses, participate in high tech careers, and lead self-determined lives (e.g., Burgstahler & Cronheim, 2001).

People with disabilities benefit from the opportunities technology offers everyone else, such as word processing, Internet exploration, and database access. In addition, however, some individuals use technology to compensate for the inability to perform a specific function due to a disability. For example, a person who cannot speak with his or her own voice can use a computer-based speech synthesizer to "speak" for him or her.

Although the benefits of technology may be even greater for people with disabilities than for those without disabilities, individuals with disabilities are less likely to own a computer or to use the Internet (Kaye, 2001). Even for those who can operate a computer, the design of many Web pages, instructional software programs, and other electronic and information technologies create access barriers (Waddell, 1999). For example, Web pages that do not include text alternatives that can be read by speech and Braille output systems limit information access by a student who is blind; the content of multimedia resources that do not have captions is inaccessible to a viewer who is deaf; and scientific equipment that cannot be operated from a seated position is inaccessible to a lab assistant who uses a wheelchair.

The positive impact of postsecondary education, as well as the challenge of poor employment rates for people with disabilities, make increasing their success in college an important goal (Yelin & Katz, 1994). Clearly, technology access that leads to success in postsecondary education has the potential to improve career outcomes for people with disabilities, but what challenges exist, and how can they be overcome to ensure that students with disabilities have access to the technology they need?

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## Case Study

Imke, who is blind, uses a refreshable Braille display (which displays screen text in Braille, line by line, using plastic pins) to access text on a computer screen. Her system cannot interpret graphic images.

### Problem

Imke completed a Ph.D. degree in Atmospheric Sciences at the University of Washington. While pursuing her studies there, some plots of climate indices on a Web site were not accessible to her, since her refreshable Braille display is not capable of reproducing graphics.

### Solution

Imke contacted the person responsible for placing the indices on the Web site and described the challenges she was facing. The idea to include text descriptions came out of their conversation. Basically, he created a short text description to appear directly above or below each plot. Imke can access this text with her Braille output system. People who have slow modems and others using speech synthesizers now also have access to this content.

### Conclusions

This case demonstrates that for success in higher education, students with disabilities need to know what technology solutions will work for them and how to advocate for their own needs. In addition, the following points should be kept in mind:

1. *Access barriers for a specific student with a disability can be best resolved when the content developer works in collaboration with the student.*
2. *For a student who is blind, the greatest challenge in accessing Web sites is gaining access to the content embedded in graphics. Many times, all that is required is that the Web content developer post graphics with the information in text form.*
3. *The need for making accommodations for a specific student can be minimized if universal design principles are employed when Web pages are being developed. Universal design means that the wide range of characteristics of potential product users is anticipated ahead of time and accessibility features are built into the product's design. (Disabilities, Opportunity, Internetworking, and Technology, n. d., Conclusions sections, para. 2-4)*

More information about this case can be found at: [http://www.washington.edu/doit/Faculty/Strategies/Academic/Webpages/webpages\\_case\\_study.html](http://www.washington.edu/doit/Faculty/Strategies/Academic/Webpages/webpages_case_study.html)

## Challenges

In order for students with disabilities to pursue postsecondary academic and career options, they must have access to the high tech tools available to their nondisabled peers. These include computers, Web sites, Internet-based distance learning courses, instructional software, and scientific equipment. Achieving this goal requires that (a) appropriate assistive technology be readily available, and (b) barriers to electronic tools and resources be eliminated.

For example, it is important that students who are blind have access to speech and/or Braille output devices. But access to this assistive technology is not enough. In order for them to benefit fully from this technology, the educational software, applications software, Web pages, and other electronic resources they use must be designed in such a way that their full functionality can be accessed by using their keyboard and speech or Braille output system.

Legal mandates (e.g., the Individuals with Disabilities Education Act, Section 504 of the Rehabilitation Act, the Americans with Disabilities Act) that apply to computer access for students and employees with disabilities are not always reflected in practice. Consumers and service providers identify the two biggest barriers to assistive technology access to be the lack of knowledge about appropriate assistive technology and lack of funding. Stakeholders are not fully aware of technology options, legal issues, and advocacy strategies. These stakeholders include people with disabilities, parents and mentors, government entities, paraprofessionals, policymakers and administrators, precollege and postsecondary educators, librarians, technical support staff, and employers. Studies have found that other access challenges include (a) lack of trained professionals to evaluate assistive technology, and (b) the bureaucracy of public programs and insurance companies (National Council on Disability, 2000; National Center for Educational Statistics, 2000).

Educational systems need to overcome these challenges in order to ensure:

- that people with disabilities gain access to the technology that has the potential to promote positive postsecondary and career outcomes,
- that people with disabilities learn to use technology in ways that contribute to positive postsecondary academic and career outcomes,

- a seamless transition of availability of technology as students move from K-12 to postsecondary and career environments, and
- the right balance between universal design and the provision of assistive technology in academic and employment computing environments.

## Meeting the Challenges

Options that can be considered in order to meet these challenges include the following:

- Stakeholders should have access to training so they can design and select accessible facilities; utilize computers and software; purchase appropriate assistive technology; and ensure that students with disabilities use technology for their maximum benefit as they pursue academics, careers, and self-determined lives.
- Policies and procedures should be established at all academic levels to ensure that universal accessibility is considered when electronic and information technology is procured.
- Policies, procedures, training, and support should be established at all educational levels to ensure that Web page, library resource, and distance learning program developers make their electronic resources accessible to everyone.
- Interagency collaboration on planning, funding, selecting, and supporting assistive technology should be fostered to ensure continuous technology access and support as students with disabilities transition through academic levels and to employment.
- Students with disabilities should be included at all stages of technology selection, support, and use, so that they learn to self-advocate regarding their needs for accessible technology in the classroom and workplace.
- Students with disabilities at high school and college levels should participate in internships and other work-based learning experiences where they can practice using technology in work settings.
- Legislators and policy makers should disseminate information about current laws, policies, and resources that are universally designed to meet the needs of various stakeholders. They should also identify and correct inconsistencies and gaps in legislation and policies regarding the selection, funding, and support of technology for people with disabilities.

## Conclusion

Access to electronic and information technology has the potential to promote positive postsecondary academic and career outcomes for students with disabilities. This potential will not be realized, however, unless stakeholders (a) become more knowledgeable about appropriate uses of technology, (b) secure funding, and (c) work together to maximize the independence, participation, and productivity of students with disabilities as they transition to college, careers, and self-determined lives. Ultimately, ensuring that all of the educational and employment opportunities that technology provides are accessible to everyone will strengthen our economy and contribute to the creation of a level playing field.

## References

- Burgstahler, S., & Cronheim, D. (2001). Supporting peer-peer and mentor-protégé relationships on the Internet. *Journal of Research on Technology in Education*, 34(1), 59-74.
- Disabilities, Opportunity, Internetworking, and Technology (n. d.). *Web pages case study*. Retrieved July 7, 2002, from [http://www.washington.edu/doit/Faculty/Strategies/Academic/Webpages/webpages\\_case\\_study.html](http://www.washington.edu/doit/Faculty/Strategies/Academic/Webpages/webpages_case_study.html)
- Kaye, H. S. (2000). *Disability and the digital divide*. (Disability Statistics Abstract Rep. No. 22). Washington, DC: U.S. Department of Education, National Institute on Disability and Rehabilitation Research. Retrieved July 7, 2002, from <http://dsc.ucsf.edu/UCSF/pdf/ABSTRACT22.pdf>
- National Center for Educational Statistics. (2000). *What are the barriers to the use of advanced telecommunications for students with disabilities in public schools?* (Rep. No. 2000-042). Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.
- National Council on Disability. (2000). *Federal policy barriers to assistive technology*. Washington, DC: Author.
- Waddell, C. D. (1999). *The growing digital divide in access for people with disabilities: Overcoming barriers to participation in the digital economy*. Retrieved July 7, 2002, from [www.icdri.org/the\\_digital\\_divide.htm](http://www.icdri.org/the_digital_divide.htm)
- Yelin, E., & Katz, P. (1994). Labor force trends of persons with and without disabilities. *Monthly Labor Review*, 117, 36-42.

## Resources

**Disabilities, Opportunities, Internetworking and Technology (DO-IT)**  
<http://www.washington.edu/doit/>

**Disability-Related Resources on the Internet**  
<http://www.washington.edu/doit/Brochures/DRR/>

**Center for Applied Special Technology (CAST)**  
Universal Design for Learning  
<http://www.cast.org/udl/>

**Closing the Gap**  
<http://www.closingthegap.com/>

**Equal Access to Software and Information (EASI)**  
<http://www.isc.rit.edu/~easi/>

**National Center for Accessible Media (NCAM)**  
<http://ncam.wgbh.org/>

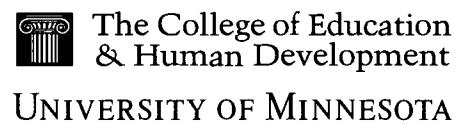
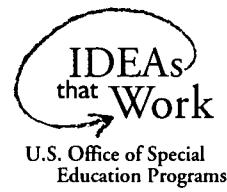
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